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Division



CANADA
DEPARTMENT OF MINES
HON. W. A. GORDON, MINISTER; CHARLES CAMSELL, DEPUTY MINISTER
EXPLOSIVES DIVISION
LT.-COL. G. OGILVIE, CHIEF INSPECTOR

ANNUAL REPORT

OF THE

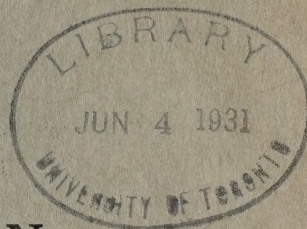
EXPLOSIVES DIVISION

OF THE

DEPARTMENT OF MINES

FOR THE CALENDAR YEAR

1930



OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1931

No. 29

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**ANNUAL REPORT
OF THE
EXPLOSIVES DIVISION OF THE DEPARTMENT OF MINES
FOR THE CALENDAR YEAR 1930**

BY

Lt.-Col. G. Ogilvie, C.M.G.

The following report deals with the administration of the Explosives Act during the year ending December 31, 1930.

MANUFACTURE OF EXPLOSIVES

The factory of the Mexco Company at Parry Sound, Ont., recorded as closed in the last report, has now been dismantled and all materials removed or destroyed. The factory of the T. W. Hand Fireworks Company, Limited was moved in the latter part of the year, from Hamilton to Dixie, Ont. This factory was in operation at Hamilton before the Explosives Act came into force, and since continued in operation although handicapped by restrictions consequent on the growth of the city around the property. Its new site offers ample space for factory buildings and magazines, and is also conveniently situated with regard to rail and road communications. A list of the licensed factories is given in Appendix A.

Inspectors of the Division made 35 visits of inspection, and 3 supplementary inspections of small firework factories were made by deputy inspectors of the Royal Canadian Mounted Police.

No serious breaches of the regulations were observed. In some cases stricter attention was required, and given, to cleanliness and good order in the conduct of fireworks manufacture. It has been observed that operators, not infrequently, are prone to regard lightly the dangers attendant on this class of work, induced possibly by consideration of the nature of the product and the small quantities of explosives handled at any one time. Constant insistence on what is covered by the comprehensive term "good housekeeping" is required to combat this.

In high explosives factories where the dangers are more obvious, factory discipline is fully recognized as a safeguard by all, and employees themselves contribute to the evolution of safety measures. A high standard of maintenance is the result.

The production of high explosives and black powders (Appendix B, Class I to III) showed a decrease of about 9 per cent from that of 1929 and amounted to 23,650 tons approximately.

ACCIDENTS IN FACTORIES

An explosion, by which two men lost their lives, occurred at the Belœil factory of the Canadian Industries, Ltd., at 9.32 a.m. on April 8. The operation in progress was the mixing of ingredients of 60 per cent polar forcite gelatin in the building known as the Talley mixing house, there being 419 pounds of nitroglycerine and a few pounds of nitro-cotton in the mixing bowl at the time. Mr. James Cunningham, house foreman, was working alone in the building. He was instantly killed, and Mr. Cameron Doberer, assistant works engineer, who had just completed an examination of the barricades surrounding the building and had walked about 100 feet therefrom, was badly cut by splinters, bruised, and rendered unconscious. He died in hospital late in the evening. That one who, in a sense, was merely a passerby, should so fall victim was a particularly sad feature of the tragedy.

Normally two men are employed in the mixing house, but on this occasion, the production required at the time being very low, the foreman carried out all operations. The routine being followed by him was to draw the charge of nitroglycerine from the neutralizing house, convey it by buggy to the entrance of the mixing house, thence by elevator to the charging floor and to a position near one end of the mixer. This done, he would weigh the small charge of nitro-cotton (about 11 pounds), empty it into the mixing bowl, weigh and have in readiness in an aluminium bucket the charge of D.N.T., then unhitching the rubber hose of the buggy, he would hold its end over the bowl, remove wooden clip from the hose, place it on top of the buggy, leave the hose hanging, and withdraw, and pin in open position the rod with rubber outlet plug in the buggy. His next duty would be merely to guide the flow of the nitroglycerine to the bowl. If this operation had been completed, which is not believed, only then would the stirrers have been started, and when running, the D.N.T. added, and after two minutes or more the "dope" would be introduced. The evidence disclosed, however, by the examination of the debris, established that the explosion had occurred when there was nitroglycerine in both the buggy and the mixing bowl—that is the nitroglycerine was being discharged at the time. The mixer was rectangular in plan. A slight and rounded ridge divided its bottom, longitudinally, in two curved depressions, conforming to the sweep of the two stirrers operating on axes mounted in the ends of the mixer. When the fragments of the mixer and stirrers were reassembled, as far as possible, it was noted that one half of the bottom had escaped small fragmentation for nearly three-quarters of its length, as did also the stirrer above it. This pointed to a dam having been formed by the nitro-cotton, so checking the flow of the nitroglycerine, for a time, along the length of one section. A little over half the charge could be poured in before such a dam would necessarily be surrounded by the flow of the nitroglycerine back over the centre ridge. Further confirmation was given of the opinion that nitroglycerine was in both buggy and bowl, when the axle of the buggy was found, bent in a semi-circle, embedded 3 feet in the ground immediately below its position at time of filling. The remnants of the aluminium bucket for the D.N.T. were also found, shot through and pitted with small pieces of lead from the buggy.

At this stage the stirrers are not in motion; everything normally is stationary, the operator merely directing the flow of the nitroglycerine from the hose to the bowl. The possibility of any article falling into the bowl was considered, but the only movable object, above the level of the rim of the bowl and near the operator, is the wooden clip lying in the top of the buggy, well clear of the bowl itself.

It is conceivable that some accident in connexion with the removal of the plug in the buggy might take place, but had any such occurred, and caused explosion, little if any nitroglycerine would then have reached the bowl, which, however, certainly contained a very considerable proportion of the charge at the time of explosion. The possible generation of static electricity to an extent compatible with the initiation of a nitroglycerine detonation, was investigated only to be discarded. Cunningham, a man of thirty-eight years of age, and in good health, had over five years' service with the company, prior to which he had been in the service of Nobels, Ltd., at Ardeer, Scotland. He was a very careful and competent operator, and not one to whom could reasonably be ascribed any carelessness in the discharge of his duties.

The explosion occurred at that stage in the process when the equipment is under no strain and where one can conceive of nothing in connexion with the work in hand arising to distract the attention of the operator from his simple task of directing the flow from the hose. One could conceive some wholly abnormal occurrence by which detonation of the nitroglycerine might be brought about, but, in the absence of any supporting evidence, that would be mere speculation.

The building was completely wrecked by the explosion; the barricades, while damaged, withstood the shock. The great bulk of the debris was held within the barricades, and light debris as shingles and splintered wood, was scattered over the ground to a distance of 200 yards with the wind, and otherwise to about 50 yards. Two pieces of corrugated iron were picked up at 250 yards down wind, and some stray pieces of heavy debris at considerable distances in other directions. One piece, the vibrator, about 10 pounds in weight, was thrown 200 yards; a piece of the stirrer measuring 18 inches passed through the porch at the entrance to a gelatin mixing house at 160 yards. Damage to other buildings was of a very minor character.

An assistant foreman in the employment of the Dominion Ammunition Division of the Canadian Industries, Ltd., accidentally detonated an electric detonator, when filing it, held in the safety vice, in the laboratory. The detonation communicated to a second detonator left lying on the table, and the man sustained injuries from the fragments of this one which caused the loss of an eye.

At the same factory an operator sustained minor injuries to the hands by the explosion of two waterproof electric detonators in the block at the capping operation. The block is of steel with one row of holes for reception of the detonators. When placed in the holes the tops of detonators project therefrom and are in turn embraced by the closing of two arms, hinged at one end of the block, and which when closed are flush with the block. The waterproofing composition is poured into the detonators through the openings in the closed arms. The block is such

that the detonation of one detonator will not detonate the one in the adjoining hole. Interest is attached to this minor accident in that one of the detonators adjacent to that accidentally fired was detonated but none other. Investigation showed that one of the wires attached to the detonator, instead of passing out over the arms, had got caught by the closing arm and passing over the block and under the arm and across the top of the next detonator had so formed a channel of communication.

When primers were being shaken onto a transfer plate behind the protection shield of thick plate glass they "flashed" and burned the operator about the hands.

There was an explosion at the fireworks factory of B. Marroni on June 15, 1929, which was not reported at the time, and which later formed the subject of an action for damages brought by the injured man against the employer. His task was to roll and fill shells for aerial bombs at a bench outside one of the small buildings. He was not under observation, but, when the explosion was heard, Marroni and his son, running out of the huts in which they were engaged, found the bench wrecked and the man standing some five or six yards away. He did not know what caused the explosion. The man was admitted to hospital. He claimed that the explosion was not caused by any action of his, that it was spontaneous, and that he suffered injuries chiefly to his hearing. The case was dismissed, it apparently being held that the explosion had been initiated by some action of the claimant. Had the composition, of which there was present at least three pounds, and probably about five pounds, been exploded accidentally when the man was working at the bench, it is hardly conceivable that he could have escaped without much more serious injuries than he received.

MAGAZINES

The number of magazines under licence at the end of the year was 336, and temporary magazine licences had been issued during the year for 223, showing an increase in all of 18 over the number for the previous year. With few exceptions the magazines were found to be well maintained, and such infractions of the regulations as were observed were of a minor character promptly rectified on representation being made to the licencees.

A total of 1,493 pounds of dynamite, distributed over 11 magazines, was found in bad condition due to exudation of nitroglycerine and was destroyed, as were also 20 detonators.

No accident or fire was reported in connexion with any licensed magazine but there were again a few cases of magazines being broken into and explosives stolen. From a farmer's association magazine four cases (200 pounds) were taken and one case from each of two other magazines. A fourth magazine was twice entered and, to all appearances, the explosives had been sought for criminal purposes. On the first occasion 33 sticks of dynamite were taken and on the second, 10 days later, 15 sticks. Some of these, broken up, were subsequently found with evidence indicative of their designed use.

Inspectors of the Division made 331 visits of inspection and 210 were made by the deputy inspectors of the Royal Canadian Mounted Police. By the co-operation of the Commissioner of the British Columbia Provin-

cial Police supervision was also exercised by his detachments over the operation of a few magazines in British Columbia in localities which could not be otherwise reached, save at considerable cost in time and money.

EXPLOSIVES FOUND

Reports have been received of 26 instances of the finding of explosives. Eleven of these relate to persons finding detonators which had obviously been lost, or under circumstances which pointed clearly to the presence of the detonators in any premises being unknown to the occupier. These findings led to accidents. The other 15 instances relate to the finding of small quantities of abandoned explosives, in all 135 pounds of dynamite and about 200 detonators, which were destroyed. These forgotten explosives varied from part of a case, apparently left at some time by a work party, to a safe-blowing outfit cached in a yard and handed to the police. The finding of a piece of fuse on a saw-mill property prompted, for some reason, a policeman to dig, when he found about 15 pounds of dynamite. Two fused cartridges found by a boy on a doorstep were handed over to the police. A tin of detonators found by school children followed a rather wandering course. It was carried to school, there taken by the teacher who handed it over to a boy to destroy. The boy was later met by a contractor who fortunately relieved him of his charge, and reported the matter to the Royal Canadian Mounted Police. The detonators were destroyed and children warned both through the agency of the school teacher and by visits made to their homes. About 15 pounds of dynamite were found in garbage by a garbage truck driver; a few sticks were found in effects left in a lodging house; the other instances were of explosives picked up in the open.

UNLICENSED PREMISES

Inspectors of the Division made 587 visits of inspection to unlicensed premises and over 2,400 were made by deputy inspectors of the Royal Canadian Mounted Police. In those districts in which the distribution of police detachments is not such as to necessarily lead to all localities being covered by patrol, special patrols have been made for the purpose of visiting dealers and others handling explosives. The regulations are generally well observed by those who, being in permanent business, have been previously instructed in their requirements. Some, while keeping records of the disposal of explosives, according to the regulations, certainly feel that it is a hardship to do so, but, in the main, there is apparent a growing realization that such records serve a useful purpose. The manner in which small quantities of explosives are kept in receptacles or detached stores, sometimes calls for improvement but instruction given in this regard is well received, and it is rare that subsequent inspection does not show a gratifying result.

A much more difficult task is to effect inspection of the explosives held by small and transient work parties, this being practically, and of necessity, restricted to the cases of those parties which happen to be at work in any particular district during a period an inspector, or deputy inspector, is there engaged.

Even so, the constant insistence on the obligation of users of explosives to keep them under lock and key, and in suitable locations, is resulting in greater care being taken. To explosives mislaid by work parties, or by private users, and left unguarded by the latter in their homes—conditions which cannot be checked by inspection—must be traced the primary causes of many of the accidents to children, recorded year after year. This consideration is presented by inspectors and deputy inspectors at every opportunity, but it is unfortunate that many of the opportunities of getting in touch with private users occur only after an accident.

IMPORTATIONS

The number of permits issued for the importation of explosives was 541, and of special permits 40. The quantities of explosives, arranged according to their classes and descriptions, imported under these permits are given in Appendix C. Approximately 13 per cent of Chinese fireworks presented for importation was rejected; other rejections were negligible.

AUTHORIZATION OF EXPLOSIVES

An addition of 18 explosives was made to the authorized list. Application was also made in respect to 49 varieties of fireworks of which 40 were authorized.

Check examination was made of 177 samples of fireworks presented for importation. Of these 17 were found not in accordance with the terms of the importation permits.

PROSECUTIONS

A hardware merchant was convicted on a charge of failing to keep explosives in a locked receptacle as required by the regulations. He had previously been cautioned and instructed. A fine was imposed. An Indian was convicted for a like offence.

A contractor, engaged in work for an oil company, was found to have a small quantity of dynamite and detonators in an unlocked box cached in a piece of open ground frequently traversed by mounted parties. He left the country on other work before proceedings could be taken, but later was located in another place by the Royal Canadian Mounted Police, charged, convicted, and fined.

Action was also taken against the management of an oil company for failure to keep small quantities of explosives in locked receptacles, and fine imposed.

The only other prosecution was for contravention of the conveyance regulations by a teamster who left his truck, containing explosives, unattended, at the entrance to a city hotel. He was fined.

ACCIDENTS

The summary of accidents as given in Appendix D records, this year, an abnormally high loss of life, the excess over that of recent years being more than accounted for by the loss in the Brockville disaster of June 26, by which 30 men were killed and 11 injured. The contractors, under contract with the Department of Public Works, were engaged in improving the channel of the St. Lawrence river and, in the course of the opera-

tions, were loading holes from the drill boat. At the time of the explosion this had been almost completed. Eleven of the last set of twelve holes had been loaded, the twelfth was being loaded. A party in a small boat had started linking up the wires of the previously loaded sets of holes. These had been temporarily short-circuited and attached to buoys. It was estimated that about 75,000 pounds of polar forcite gelatin 75 per cent, in 15-inch cartridges of 6 inches diameter, had been loaded in 46 holes, and only about 75 pounds remained on the drill boat. The holes were spaced at about 8-foot centres. The average depth of water was about 20 feet and the depth of the holes below water 14 feet. The drill boat was a large and substantially built wooden hull. It had installed on its deck 12 cyclone, well drills operated by steam engines, supplied with steam from boilers carried on board. The well drills were housed in by a light housing also of wood. The drills operated over one side of the drill boat and, drilling having been completed, these had been pulled out and rested on the framing which stood out from the side of the deck and through which they worked. The leads to the detonators had been brought up and given a turn around the outer timber of the scaffolding. When the work was at this stage a sudden rain storm came up, followed by a heavy lightning discharge which, it is conceded, was the cause of the premature explosion. The boat was literally blown out of the water. Work had been carried on continuously and the men off duty, sleeping on board, were involved in the disaster.

An explosion, fortunately not attended by injury to anyone, occurred at an oil well between 1 and 2 a.m. on February 19. Cartridges of solidified nitroglycerine to an amount equivalent to 950 quarts had been taken to the well for use on the eighteenth. Progress was made in loading shells but a storm arose and this work was stopped. About 28 unopened cases, equivalent to 280 quarts, were first put in the "dog house," a small heated room built onto the derrick frame, and later moved to the engine room. There, in the late afternoon, they were placed on boards over the heating coils. Just before the explosion certain of the men, who were seated on a bench in the rig, stated they heard a sizzling from the engine house and saw sparks. They immediately ran clear. The well structures were very badly damaged by the explosion. It was suggested that the explosion was caused by fire originating from an electric short circuit but the attendant circumstances point rather to overheating.

Other accidents in use not classified under any of the causes given in the summary but shown as "various," include one where two men were injured as the result of connecting a charge, in error, to a live wire. In another case three men engaged in road work, placed and lit three charges simultaneously. Two being observed not to have ignited, one of the men returned to extinguish the fuse of the third so that, later, all might be fired together. The charge exploded before he could do so and he was killed. In a mine, a shot firer, contrary to mining regulations, carried 20 electric detonators in the breast of his shirt while firing a shot. The wires of one of these evidently made contact with the battery as he was operating it. He was killed and his three companions injured. One of three men, going to blast holes for transmission line poles, was carrying 13 dynamite cartridges, detonators, and firing battery when an explosion occurred. Whe-

ther the man slipped or was trying to shift his cumbersome load is not known. He was killed instantly, one of the others died from injuries, and the third sustained minor injuries.

Excluding the Brockville explosion, already referred to, accidents elsewhere than in mines and quarries are responsible for very nearly the same loss in life and in injured as in the previous year. There is a repetition of the more common causes but the fatalities due to failing to get away from the shot hole or returning too soon show an increase from 12 to 21. The total fatalities in mines and quarries on the other hand show a decrease of from 30 to 18. This total of 18 for mines compared with 29 elsewhere (exclusive of Brockville fatalities) affords a striking illustration of the value of the control exercised over mining operations, especially when it is remembered that these operations account for about 70 per cent of the total consumption of explosives.

Four of the lives lost in mines were from fumes. In one case two men went below at 4 p.m. and were missed when they did not come out for supper at six o'clock. On search being made one was found dead; the other died some hours later. There had been heavy blasting on the day shift but nothing unusual was reported when the workings were examined after that blasting. It was not established whether the deceased had used explosives subsequently.

In another metalliferous mine a round of shots had been fired in a cross-cut at eleven o'clock in the evening. The ventilation pipes in the nearby drift had been disconnected as they would have been exposed to the blast. This part of the mine was not worked on night shift and at about seven o'clock in the morning two men went down to start the fan and to connect the ventilation pipe. Apparently, although they passed the fan on the way in, they decided to connect the ventilation pipe first and then to return and start the fan. They were missed at eight o'clock. Both were found to have died from carbon monoxide poisoning. The explosive regularly used in the mine was an ammonia gelatin explosive, but it transpired that a few cases of straight dynamite had been received from a neighbouring construction party in replacement of a like quantity previously lent by the mine, and it is believed that some of this was used in this particular blast.

Mention may here be made of the accident recorded as occurring in conveyance. Accidents of this class are very rare, and indeed this one was not associated with conveyance in any vehicle but befell a miner who, while carrying a number of detonators in underground workings, held these in his left hand so freeing his right to help a companion to push a car. His foot slipped, causing him to clutch at the car with his left hand. The detonators exploded and inflicted severe wounds to his hand.

Accidents arising from playing with detonators and other explosives accounted for 3 deaths and 53 persons injured. This is slightly higher than the corresponding figures for 1929 which were 2 and 51. The average for the five years 1925-1929 inclusive was 4.4 killed and 62.4 injured.

The circumstances of these, also of the accidents classed as "various," are indicated, in so far as has been ascertained, in Appendix D. The prevalence of accidents of this character has repeatedly been the subject of com-

ment in these reports. A perusal of the brief accounts given of them, can hardly fail to bring realization of the moral responsibility devolving on anyone in possession of explosives to keep them under lock and key, and, when taken out for use, to account for all.

There is little doubt but that playing with fireworks is responsible for many unrecorded accidents. At times of celebrations the fire calls attributed to the accidental starting of fires by fireworks are numerous. A more unusual fire was that caused by the burning remains of a sky rocket falling on a touring car which was completely destroyed. Occasionally also there is evidence of malicious discharge of fireworks. Two cases are known of fires started, and damage done, by throwing firecrackers into dwelling houses. Damage to the value of \$400 was done by boys setting fire to firecrackers displayed in a store. Serious damage in another case followed the ignition of firecrackers in a shop window by means of a burning glass; letters were destroyed by firecrackers dropped into a mail box.

APPENDIX A

Factories Licensed to Manufacture Explosives in 1930

Owner	Location of factory	General nature of product	Remarks
Canadian Industries, Ltd.....	Belœil, P.Q.....	Blasting explosives, black powders, propellants.	
Canadian Industries, Ltd.....	James Island, B.C..	Blasting explosives, black powders.	
Canadian Industries, Ltd.....	Nobel, Ont.....	Blasting explosives.	
Canadian Industries, Ltd.....	Brownsburg, P.Q....	Ammunition, detonators, etc.	
North Star Explosives Co., Ltd.	Prescott, Ont.....	Fulminate of mercury...	Operation intermittent.
Canadian Safety Fuse Co.....	Brownsburg, P.Q....	Safety fuse.	
T. W. Hand Fireworks Co., Ltd.	(Hamilton, Ont....)	Fireworks.	
Toronto Fireworks Co.....	(Dixie, Ont.....)	Fireworks.	
Dominion Fireworks Manufacturing Co.	Toronto, Ont.....	Fireworks.	
B. Marroni.....	Dixie, Ont.....	Fireworks.	
B. Marroni.....	St. Pierre, P.Q.....	Fireworks.....	Operation intermittent.
MacDonald Metal Products Co.	Waterloo, P.Q.....	Toy pistol caps.	

APPENDIX B

Production of Explosives in Canadian Factories during the Year 1930

	Quantity
Class I. Gunpowder.....	379,575 lb.
" II. Nitrate mixtures.....	1,236,200 "
" III. Nitro-compounds—	
Division 1.....	45,687,067 "
" V. Fulminates—	
Division 1.....	61,599 "
" VI. *Ammunition—	
Division 1—	
Safety cartridges.....	94,635,789
Safety fuse.....	Output of one factory.
Railway torpedoes.....	Output of one factory.
Percussion caps.....	Output of one factory.
Division 3—	
Detonators and electric detonators.....	Output of one factory.
" VII. Fireworks—	
Division 2.....	(approx.) \$203,000

*Exclusive of artillery ammunition but includes small arms ammunition made in Government factories.

APPENDIX C

Explosives Imported into Canada January 1 to December 31, 1930

Class	Division	Description	Quantity
I		Gunpowder.....	68 lb.
II		Nitrate mixtures.....	9,976 "
III	1	Mixtures containing liquid nitro-compounds.....	75,154 "
	2	Nitro-compounds:—	
		(a) Propellants.....	85,499 "
		(b) For use in explosives factories.....	112,487 "
		(c) For other manufacturing purposes.....	757,188 "
V	1	Fulminates.....	15,000 "
VI	1	Percussion caps.....	32,500 "
	2	Safety fuse.....	3,000 ft.
		Miner's squibs.....	2,600
		Detonating fuse.....	598,993 ft.
		Fireworks fuse.....	250,000 "
	3	Detonators and electric detonators.....	41,100
VII	2	Manufactured fireworks.....	472,598 lb.

APPENDIX D Accidents from Explosives during the Calendar Year 1930

Circumstances or Cause	In Mines and Quarries			Elsewhere			Total		
	Number of			Number of			Number of		
	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
I. Manufacture*									
II. Keeping.....				4	2	3	4	2	3
III. Conveyance (other than by railway).....	1		1				1		1
Total, Manufacture, Keeping, Conveyance.	1		1	4††	2	3	5	2	4
IV. Use and Miscellaneous—									
Shot Firing—									
(a) Prematures, and failing to get away from shot hole.....	11	4	10	14	10	9	25	14	19
(b) Firing by electricity when persons are at the shot hole.....									
(c) Not taking proper cover.....	7	1	7	7	2	11	14	3	18
(d) Projected debris.....	6	1	5	10	1	10	16	2	15
(e) Hangfires, and returning too soon to shot hole.....	5	1	5	13	11	5	18	12	10
(f) Tampering with misfired shots.....	1		1				1		1
(g) Ramming or stemming the charge.....	2		3	4	1	3	6	1	6
(h) Sparks, flame, etc.....	3	1	2				3	1	2
(i) Boring into unexploded charges.....	6	3	7	1		1	7	3	8
(j) Striking unexploded charge in removing debris.....	4	1	3	1		3	5	1	6
(k) Preparing charge.....	2		2	2		2	4		4
(l) Lighting fuse before inserting charge.....	1		1				1		1
(m) Fumes.....	2	4					2		
(n) Socketing.....				5	1	4	5	1	4
(o) Various.....	2	2	5	5	33	15	7	35	20
† Miscellaneous—									
(a) Playing with detonators.....				27	1	42	27	1	42
(b) Playing with other explosives.....				10	2	12	10	2	12
(c) Various.....				11	1	16	11	1	16
Total Use and Miscellaneous.....	52	18	51	110	63	133	162	81	184
Total all Circumstances.....	53	18	52	114	65	136	167	83	188

*Circumstances are given in text of report.

†Circumstances are given on next page.

††Except for these the accidents given in this table occurred in circumstances not directly controlled by the Act.

APPENDIX D

Playing with Detonators

Cause of Accident	Killed	Injured
Boy, age 13, and companion entered brickyard and found a box of detonators, fuse, and a stick of dynamite near a steam shovel, and took detonators to their homes. One boy squeezed several detonators in a vice and finally fired one by driving a nail into it. His hand was badly mangled. The other boy gave up his detonators to his mother who handed them to the police.....		1
A farmer cached a box of detonators in a basket, which he tied to a beam over his bed, 9 feet from the floor. When opportunity offered his son, age 4½ years, and daughter, age 2½ years, placed a large box on the bed and on top of that a child's high chair. By climbing upon this the boy was able to reach the detonators. He placed one on the stove and struck it with a hammer. It exploded. The boy received injuries to right hand which necessitated amputation of thumb and two fingers, whilst the girl received injuries to the face.....		2
Boy, age 12, found a detonator on road near his home. He picked composition with a match. He lost two fingers and thumb of right hand, and his eye was injured. A younger brother received injuries to one finger of right hand.....		2
Boy, age 10, lost an eye while playing with a detonator which exploded.....		1
Youth, age 20, found a detonator in his father's shed, and knowing its properties, started to loosen the powder by squeezing the tube over a stove. The loose powder ignited firing the detonator. He lost thumb and two fingers of right hand.....		1
Two boys, ages 6 and 5, and a girl, age 4, found a box of detonators and not knowing the contents proceeded to open it by placing it on a rock and striking it with a stone. The elder boy was killed, by the explosion. The others were severely cut about arms, face, and legs. A second similar tin was found in a nearby summer house and destroyed.....	1	2
Man found a detonator and tried to remove the powder with a pin when it exploded. He was severely cut about hands and face.....		1
Boy, age 10, helping to search for lost detonators, found one but did not give it up. Later, while playing, it exploded in his hand. He lost all fingers of his left hand except the little finger.....		1
Boy, age 14, helping his father to unload some tools bought at an auction sale, found and kept a box of detonators. Later he tried poking one with a match. It exploded. Two fingers of his left hand were badly torn and his left eye injured.....		1
Two boys, ages 12, found a box of detonators in a garage. While playing with an electric train they placed detonators across the rails. One became heated and exploded. Both boys were injured.....		2
Two lads, drawing hay, found box of detonators in barn. One lad took one and later tried opening it with a knife. It exploded. Injuries were slight. The detonator probably was damp.....		1
Boy, age 7, received a detonator from a companion. He hit it with an axe. He sustained several minor injuries to body, hands, and eyelids.....		1
Two boys, ages 14, obtained detonators from a neighbour's barn and while playing with them one exploded. One lad lost two fingers of left hand. The other received minor injuries. Fearing their parents' wrath for playing with explosives, they concocted the story that when their cows blocked the road three men shot at them, with rifles, from an automobile.....		2
Boy, found detonator and cut it with a knife. By the explosion he had two fingers of left hand mutilated and sustained burns to left knee, right hand, and left eye.....		1
Boy, age 8, found a detonator and struck it with a stone. He lost tips of three fingers of left hand by the explosion.....		1
Man found box of detonators by roadside. Not knowing their properties he used a stone to open the box. Explosion followed by which his left hand was blown off. His neck and thighs were seriously injured.....		1

APPENDIX D—Continued
Playing with Detonators

Cause of Accident	Killed	Injured
Two boys, ages 8 and 6, found two detonators in an old fish house, and struck them with a rock. Both received minor injuries. Owing to poor storage conditions these detonators were damp and corroded.		2
Youth, age 20, while cleaning out a drawer in shed found a box of detonators and in some unexplained manner exploded one, which set off the others in the box. He suffered many cuts in face.		1
Three children, ages 4, 14, and 16, playing with cans found one they could not open and as something inside rattled they threw it on the ground. The can contained detonators and by the explosion one child lost an eye and received injuries to legs, arms, and body. The second child's foot was shattered and necessitated amputation. The youngest suffered shock and minor injuries.		3
Boy, age 14, found a detonator and picked it with a pin. It exploded and his chest and arms were lacerated.		1
Youth, took detonator from a neighbour's farm and while playing with it caused explosion. He lost thumb and two fingers of left hand.		1
Two boys, ages 10 and 15, found detonator in old shack. One boy held the detonator whilst the other applied a match to it. It exploded. One boy lost all fingers of right hand, the other lost left thumb and his left eye was injured.		2
Boy, age 12, found five detonators in old shed on his father's farm. He applied a match to them. He lost his left hand and had his right wrist and face lacerated.		1
Youth, 18, picked up a detonator on farm where he was working. He cut it with a saw, causing it to explode. Both his eyes were injured, and he was otherwise wounded in the face.		1
Boy used detonator as pencil protector. It exploded in school. He lost index finger and thumb of left hand. Another boy received injuries to his leg.		2
Boy, age 8, found detonators in an old shed and took them to school. He gave two to an older boy who held them over the stove. They exploded. The older boy lost the tips of his thumb and two fingers of his left hand. Five other boys standing around the stove received minor injuries.		6
Boy, age 4, found a detonator in his father's house. He hit it on cement step. He lost thumb and two fingers of left hand in the explosion which followed.		1
	1	42

APPENDIX D—Continued

Playing with Explosives

Cause of Accident	Killed	Injured
<i>Powders—</i>		
Boy, age 12, applied a light to a can of powder which exploded. He lost the sight of one eye.....		1
Boy, age 14, extracted powder from 6 shotshells, placed it in a bottle and applied a light. He received injuries to face and eyes.....		1
Boy, age 16, placed can over small pile of powder and applied a light. In the explosion that followed he was cut about face and body.....		1
Boy, age 13, prepared a highly explosive mixture and placed it in a bottle intending to explode the charge electrically. Holes were drilled in the cork to admit electrodes. The bottle was placed in a fruit sealer and while screwing on the lid the charge exploded. The boy died from his injuries. A companion escaped injury.....	1	
<i>Ammunition—</i>		
Two boys constructed a toy cannon from an old gas pipe, loaded it with powder and applied a match. Both were severely cut about face and body by projected pieces of pipe.....		2
<i>Dynamite—</i>		
Two youths, ages 18 and 19, tied two sticks of dynamite to a lighted rag and dropped them down a four-inch pipe of a drilled well. The dynamite exploded. One youth was killed instantly, the other was removed to hospital in a critical condition.....	1	1
Children, on their way to school, found a case containing 41 sticks of dynamite. They started a fire in school yard and burned 29 sticks. One boy took 5 sticks and burned them in a fire in his yard at home; 7 sticks taken home by other boys were destroyed by their parents. Indications pointed to the dynamite having been cached for many years, since about 1913. It had been uncovered by a steam shovel. Fortunately no one was injured.		
<i>Firecrackers—</i>		
Firecrackers exploded in hands of boys.....		2
Injured by burns caused by firecrackers.....		4
	2	12

APPENDIX D—Concluded
Various Accidents

Cause of Accident	Killed	Injured
Farmer placed a box containing 7 sticks dynamite, 12 detonators and several feet of fuse, which had become damp, in cook stove oven to dry. There was an explosion which wrecked the house, and severely injured three of the occupants.....		3
Man burning rubbish, raked from garden, was wounded in the leg by fragments and shot from shotshell which exploded.....		1
Man testing detonators thought to be damp, attached 15 inches fuse to one and lit it. It went out. He returned, cut off a piece and relit it. He returned a third time, cut off another piece, and when he applied a light it exploded, communicating explosion to a box of detonators nearby. He was severely injured about face and hands.....		1
Boys lighted a grass fire. There was an explosion. One man was injured in leg. He investigated and found three boxes of detonators and others loose, scattered around. These were collected and destroyed.....		1
An explosion followed the putting of wood in a kitchen stove. One boy, holding his hands over the stove for warmth, had three fingers of his left hand splintered and the top of his thumb blown off. A second boy had his leg, on both sides, opened. A third boy had his face cut. The origin of the explosive among the wood was not known.....		3
Man while watching a firework display, was struck on the face by a spent rocket. He received injuries to his eye.....		1
A firework display helper was injured when a shell exploded prematurely in a mortar.....		1
Man found a fuse with cap attached. In trying to pull fuse off the cap exploded. Hand injured.....		1
Woman threw rubbish, which included a 22 R.F. cartridge, on a fire. It exploded and she was injured in the eye by a fragment.....		1
One youth was killed and another injured when explosion occurred in rowing boat from which they were fishing. It is believed that there were explosives with the fishing tackle, and that the lads were smoking.....	1	1
Two junk dealers were disposing of detonators by emptying them from a container, into deep water, from a pierhead. Explosion was caused by some of these striking a floating fender. Both men were injured.....		2
	1	16

APPENDIX E

Authorized Explosives

Explosives manufactured by Canadian firms as hereunder detailed:—

Burrowite Explosives, Ltd.

Burrowites Nos. 1, 2, and 3.

Canadian Industries, Ltd.

Polar dynamite—25, 30, 35, 40, 50, and 60 per cent.

Polar dynamite, mining—35, 40, and 50 per cent.

Polar ammonia dynamite—20, 25, 30, 35, 40, 50, 60 per cent and “F.”

Polar ammonia dynamite, mining—20, 25, 30, 35, 40, 50, 55, and 60 per cent.

Polar gelatinized dynamite—50, 60, 65, 70, and 75 per cent.

Polar forcite gelatin—30, 35, 40, 50, 60, 75, 80, and 90 per cent.

Polar forcite gelatin—Diamond—30, 35, 40, 50, 60, 75, 80, and 90 per cent.

Polar gelatin dynamite—30, 35, 40, 50, 60, 75, and 80 per cent.

Special dynamites—No. 1.

Coal mining explosives.

Polar Monobel Nos. 4, 6, 7, and 12.

Polar CXL-ite No. 2.

Polar stumping powders No. 1 and extra.

S.N.G. and S.N.G. (oil well explosive).

Export gelignites—42, 50, 51, 58, and 62 per cent.

Samsonite—50 and 60 per cent.

Safety fuse lighters.

Signal bombs.

Cordite.

Black blasting powders.

Black powder pellets.

Gunpowder.

Sporting powders.

Safety fuse powder.

Canadian Safety Fuse Co., Ltd.

Safety fuse—“Clover” brand.

Safety fuse—“Black Clover” brand.

Safety fuse—“Beaver” brand.

Safety fuse—“White Jacket” brand.

Safety fuse—“Crown” brand.

Safety fuse—“Moose” brand.

Dominion Cartridge Co., Ltd.

Ammunition.

Detonators.

Percussion caps.

Railway torpedoes.

Electric detonators.

Railway fuses.

Mexco Ltd.

Klorex, Nos. 1 and 2.

North Star Explosives Co., Ltd.

Fulminate of mercury.

All explosives on the British authorized list are provisionally authorized in Canada, and in addition, those manufactured by the following firms, as detailed below:—

Aetna Explosives Co., Inc.

Standard dynamite L.F.—15, 20, 25, 27, 30, 33, 35, 40, 45, 50, and 60 per cent.

Straight dynamite—15, 20, 25, 27, 30, 33, 35, 40, 45, 50, and 60 per cent.

Keystone standard gelatin—40, 60, and 75 per cent.

Stumping powders—20 and 30 per cent.

APPENDIX E—Continued**Authorized Explosives**

American Glycerine Co.

Nitroglycerine.

American Powder Co.

American R.C. 22 short.

Atlas Powder Co.

Electric blasting caps, Nos. 6, 7, and 8.

Blasting caps, Nos. 6, 7, and 8.

Nitrocellulose.

Trinitrotoluene.

California Cap Co.

Detonators.

Dumore National Chemical Co.

Regina stumping powder Nos. 1 and 2.

Regina rock powder Nos. 1 and 2.

E. I. Dupont de Nemours & Company, Inc.

Dupont bulk rifle powders (Nos. 80, 90, 91, 92) Rifle No. 1 Schuetzen.

Dupont smokeless shotgun powder.

Dupont pistol powders Nos. 3 and 5.

Dupont sporting rifle powders Nos. 95, 96, and 93.

Dupont military rifle powders (M.R. No. 20-23) (Nos. 10, 21, 22, 30, 40, and 50).

Dupont gallery rifle powder No. 75.

Dupont Schultze smokeless shotgun powder.

Ballistite smokeless shotgun powder.

Improved military rifle powders Nos. 13, 15, 15½, 16, 17, 17½, 18, 23, 25, and 25½.

Dupont dense smokeless shotgun powder.

Fulminate of mercury.

Guncotton.

Trinitrotoluene.

Dynamite and blasting gelatin.

Agritol.

Ensign-Bickford Co.

Corbeau-Bickford fuse.

Hercules Powder Co.

Bullseye revolver powder.

Infallible smokeless shotgun powder.

Dynamite and blasting gelatin.

Illinois Powder Manufacturing Co.

Ammonia dynamite—40 and 60 per cent.

Powertol No. 1 and No. 3.

Independent Torpedo Co.

Nitroglycerine.

Puget Sound and Alaska Powder Co.

Gelatin dynamite—25, 30, 35, 40, and 60 per cent.

Dynamite, L.F.—20, 30, 40, and 60 per cent.

Special gelatin—25, 30, 40, and 60 per cent.

Straight gelatin—25, 30, 40, and 60 per cent.

Special stumping dynamite.

Special stumping dynamite—20 and 30 per cent.

Special dynamite—40 and 60 per cent.

Straight dynamite—40 and 60 per cent.

United Railway Signal Corporation.

Railway torpedoes.

APPENDIX E—*Concluded*

Authorized Explosives

Western Cartridge Co.
Detonators.

Brucker & Zinke.

Safety fuse—"Globe" brand.

Fireworks as manufactured by the following Canadian makers, namely:—

T. W. Hand Co., Ltd.

Toronto Fireworks Co., Ltd.

Dominion Fireworks Manufacturing Co.

Berardo Marroni.

MacDonald Metal Products Company, Ltd.

Certain fireworks manufactured by the following foreign makers, namely:

Rochester Fireworks Company.

M. Backes Sons, Inc.

Hitt Fireworks Co., Inc.

A. Jedel.

Kilgore Manufacturing Co.

National Fireworks, Inc.

Victory Sparkler Co.

Essex Specialty Co.

Edwards Co.

Federal Buster Corporation.

Los Angeles Fireworks Co.

Geb. Weinrich.

Central Railway Signal Co.

Fred. Wicke.

Ying Shing Loong.

M. Wagner.

J. F. Eisfeld.

International Fireworks Co.

Edmiston Manufacturing Co.

Adrian and Rohde.

Hamburg-Bremer Handelgesellschaft.

A. G. für Anilinfabrikation.

Wilhelm Fischer.

Potts Fireworks Display Co.

Antonelli Fireworks Co.

Safety Automatic Toy Co.

American Fireworks Co.

Blumberg & Co.

Standard Railway Fusee Corp.

Unexcelled Manufacturing Co., Inc.

H. Nicolaus & Co.

Continental Fireworks Manufacturing Co

Burke and James Inc.

Coston Supply Co.

Gerka-Werke.

John G. Marshall.

Norman Willets Photo Supply Co.

New Jersey Flugent Co.

Also Chinese firecrackers with gunpowder composition and not exceeding 4 inches in length and nine-sixteenth inch in diameter and such other varieties the authorization of which has been specially notified to the parties immediately concerned.

